

**IN THE CLAIMS**

Please amend the claims as described below. In accordance with 37 CFR §1.121, a complete listing of all claims in the application is provided below. Notably, the status of each claim is indicated in the parenthetical expression adjacent to the corresponding claim number.

**Claims 1 - 50 (Canceled).**

1        Claim 51 (**Currently Amended**): An EIW unit for use in sensing a process  
2        parameter of a process to manufacture an integrated circuit using integrated circuit  
3        processing equipment, the EIW unit comprising:  
4        a substrate having a wafer-shaped profile;  
5        a plurality of light sources, disposed on or in the substrate, to output light to permit  
6        sampling of sample a process parameter of the process performed by the integrated circuit  
7        processing equipment; and  
8        a predetermined surface layer disposed above the plurality of light sources and  
9        capable of receiving a surface structure thereon, wherein the surface structure is formed by  
10       the integrated circuit processing equipment during processing.

1        Claim 52 (**Previously Presented**): The EIW unit of claim 51 wherein the  
2        predetermined surface layer is patterned to guide or shape the light output by the plurality  
3        of light sources.

1        Claim 53 (**Previously Presented**): The EIW unit of claim 51 wherein the  
2        predetermined surface layer includes a grating structure.

1 Claim 54 (**Previously Presented**): The EIW unit of claim 53 wherein the refractive  
2 index of the grating structure is capable of being changed dynamically.

1 Claim 55 (**Currently Amended**): The EIW unit of claim 53 54 wherein the EIW unit  
2 further includes an acoustic modulation module disposed in or on the substrate to control  
3 the refractive index of the grating structure.

1 Claim 56 (**Previously Presented**): The EIW unit of claim 51 wherein the plurality of  
2 light sources operates in an end-point mode.

1 Claim 57 (**Previously Presented**): The EIW unit of claim 51 wherein the plurality of  
2 light sources operates in a real-time mode.

1 Claim 58 (**Previously Presented**): The EIW unit of claim 51 wherein  
2 predetermined surface layer includes a plurality of layers.

1 Claim 59 (**Currently Amended**): The EIW unit of claim 58 wherein the plurality of  
2 layers includes ~~is comprised of~~ a composite dielectric structure.

1 Claim 60 (**Previously Presented**): The EIW unit of claim 51 wherein the plurality of  
2 light sources output light at different wavelengths.

1           **Claim 61 (Previously Presented):** The EIW unit of claim 60 further including a  
2   plurality of light sensors, disposed in or on the substrate wherein the light sensors sample  
3   light that is reflected or scattered by the surface structure formed by the integrated circuit  
4   processing equipment during processing.

1           **Claim 62 (Previously Presented):** The EIW unit of claim 51 wherein the intensity  
2   of the light output by the plurality of light sources may be varied or modulated.

1           **Claim 63 (Previously Presented):** The EIW unit of claim 51 wherein the intensity  
2   of the light output of a first light source of the plurality of light sources may be varied or  
3   modulated relative to another light source of the plurality of light sources.

1           **Claim 64 (Previously Presented):** The EIW unit of claim 51 wherein the plurality of  
2   light sources is VCSELs or LEDs.

1           **Claim 65 (Previously Presented):** The EIW unit of claim 51 further including a  
2   plurality of light sensors, disposed in or on the substrate, wherein the light sensors sample  
3   light that is reflected or scattered by the surface structure.

1           **Claim 66 (Previously Presented):** The EIW unit of claim 65 wherein the plurality of  
2   light sensors are CMOS devices, charge coupled devices, or photodiodes.

1           **Claim 67 (Previously Presented):** The EIW unit of claim 65 wherein the plurality of  
2 light sensors periodically or continuously sample the intensity of the light while the EIW unit  
3 is disposed in the integrated circuit processing equipment and undergoing processing.

1           **Claim 68 (Previously Presented):** The EIW unit of claim 67 further including data  
2 storage, coupled to the plurality of light sensors, to store data which is representative of the  
3 parameter.

1           **Claim 69 (Previously Presented):** The EIW unit of claim 67 further including:  
2 communication circuitry to provide the data which is representative of the parameter  
3 to external circuitry; and  
4 at least one rechargeable battery, to provide electrical power to the communication  
5 circuitry.

1           **Claim 70 (Previously Presented):** The EIW unit of claim 67 wherein the plurality of  
2 light sensors sample the intensity of reflected or scattered light.

1           **Claim 71 (Previously Presented):** A method of measuring a process parameter of  
2 an integrated circuit manufacturing process using an EIW unit having a substrate, which  
3 includes a wafer-shaped profile, a plurality of light sources disposed on or in the substrate,  
4 and a predetermined surface layer disposed above the plurality of light sources, the method  
5 comprising:  
6 placing the substrate into the integrated circuit processing equipment;

7 performing the integrated circuit manufacturing process wherein a surface structure  
8 forms on or in the predetermined surface layer during the manufacturing process;  
9 enabling the plurality of light sources to output light;  
10 sampling the response to the light output by the plurality of light sources; and  
11 determining the process parameter using the sampled response.

1 Claim 72 (**Previously Presented**): The method of claim 71 further including  
2 changing the refractive index of the predetermined surface layer.

1 Claim 73 (**Previously Presented**): The method of claim 71 further including  
2 dynamically changing the refractive index of the predetermined surface layer while  
3 performing the integrated circuit manufacturing process.

1 Claim 74 (**Previously Presented**): The method of claim 71 wherein the response  
2 to the light output by the plurality of light sources is sampled after performing the integrated  
3 circuit manufacturing process.

1 Claim 75 (**Previously Presented**): The method of claim 71 wherein the response  
2 to the light output by the plurality of light sources is sampled while performing the integrated  
3 circuit manufacturing process.

1 Claim 76 (**Previously Presented**): The method of claim 71 wherein the plurality of  
2 light sources output light at different wavelengths.

1       **Claim 77 (Previously Presented):** The method of claim 71 wherein the EIW unit  
2 further includes a plurality of light sensors, disposed in or on the substrate, and wherein the  
3 plurality of light sensors sample the response to the light output by the plurality of light  
4 sources.

1       **Claim 78 (currently amended):** The method of claim 71 wherein ~~further including~~  
2 sampling the response to the light output by the plurality of light sources includes sampling  
3 the light that is reflected or scattered by the surface structure formed by the integrated  
4 circuit processing equipment during processing.

1       **Claim 79 (Previously Presented):** The method of claim 71 further including varying  
2 the intensity of the light output by the plurality of light sources.

1       **Claim 80 (Previously Presented):** The method of claim 71 further including varying  
2 the intensity of the light output of a first light source of the plurality of light sources relative  
3 to another light source of the plurality of light sources.

1       **Claim 81 (Previously Presented):** The method of claim 71 wherein the EIW unit  
2 further includes a plurality of light sensors, disposed in or on the substrate, and wherein the  
3 plurality of light sensors periodically or continuously sample the response to the light output  
4 by the plurality of light sources while performing the integrated circuit manufacturing  
5 process.

1       **Claim 82 (Previously Presented):** The method of claim 81 wherein the EIW unit  
2 further includes a data storage, disposed in or on the substrate, and wherein the method  
3 further includes storing the response to the light output by the plurality of light sources in  
4 the data storage.

1       **Claim 83 (Previously Presented):** The method of claim 81 wherein the EIW unit  
2 further includes communication circuitry, disposed in or on the substrate, and wherein the  
3 method further includes communicating the response to the light output by the plurality of  
4 light sources.

1       **Claim 84 (Previously Presented):** The method of claim 71 further including  
2 sampling the intensity of the reflected or scattered light using a plurality of light sensors.

1       **Claim 85 (Previously Presented):** The method of claim 84 wherein the plurality of  
2 light sensors is disposed on or in the substrate of the EIW unit.

1       **Claim 86 (Previously Presented):** The method of claim 85 further including varying  
2 the intensity of the light output by the plurality of light sources.

1       **Claim 87 (Previously Presented):** The method of claim 85 further including varying  
2 the intensity of the light output of a first light source of the plurality of light sources relative  
3 to another light source of the plurality of light sources.

1           **Claim 88 (Previously Presented):** The method of claim 85 further including  
2   periodically or continuously sampling the response to the light output by the plurality of light  
3   sources while performing the integrated circuit manufacturing process.

1           **Claim 89 (Previously Presented):** The method of claim 85 further including  
2   sampling the response to the light output by the plurality of light sources after performing  
3   the integrated circuit manufacturing process.

1           **Claim 90 (Previously Presented):** The method of claim 85 further including  
2   changing the refractive index of the predetermined surface layer.

1           **Claim 91 (Previously Presented):** The method of claim 85 further including  
2   dynamically changing the refractive index of the predetermined surface layer while  
3   performing the integrated circuit manufacturing process.

1           **Claim 92 (Previously Presented):** The method of claim 71 wherein the process  
2   parameter is a thickness of the surface structure.

1           **Claim 93 (Previously Presented):** The method of claim 71 wherein the process  
2   parameter is a spatial distribution of a surface structure.

1           **Claim 94 (Previously Presented):** A system for sensing process parameters of a  
2   process for manufacturing an integrated circuit using integrated circuit processing



3 equipment, the system comprising:  
4 an EIW unit, including:  
5 substrate having a wafer-shaped profile; and  
6 a source, disposed on or in the substrate, to output interrogation signals;  
7 a sensor to sample the interrogation signals while or after the EIW unit is subjected  
8 to processing by the integrated circuit processing equipment; and  
9 a computing device to receive the sampled interrogation signals from the sensor and  
10 determine the process parameter using the sampled interrogation signals.

1 Claim 95 (**Previously Presented**): The system of claim 94 wherein the source is a  
2 VCSEL or LED.

1 Claim 96 (**Previously Presented**): The system of claim 95 wherein the sensor is a  
2 CMOS device, charge coupled device, or photodiode.

1 Claim 97 (**Previously Presented**): The system of claim 94 wherein the process  
2 parameter is the surface profile.

1 Claim 98 (**Previously Presented**): The system of claim 94 wherein the sensor is  
2 disposed on or in the substrate.

1 Claim 99 (**Previously Presented**): The system of claim 98 further including  
2 communications circuitry disposed on the substrate, wherein the communications circuitry

3 is coupled to the sensor to provide the sampled interrogation signals to the computing  
4 device.

1 Claim 100 (**Previously Presented**): The system of claim 94 wherein the sensor  
2 operates in an end-point mode.

1 Claim 101 (**Previously Presented**): The system of claim 94 wherein the sensor  
2 operates in a real-time mode.

1 Claim 102 (**Previously Presented**): The system of claim 94 wherein the EIW unit  
2 further includes a predetermined surface layer disposed above the source, and wherein the  
3 source is a plurality of light sources that output light at different wavelengths.

1 Claim 103 (**Previously Presented**): The system of claim 102 wherein the sensor is  
2 a plurality of light sensors wherein the light sensors sample light that is reflected or  
3 scattered by a surface structure formed by the integrated circuit processing equipment  
4 during processing.

1 Claim 104 (**Previously Presented**): The system of claim 103 wherein the plurality  
2 of light sensors is disposed in or on the substrate.

1       **Claim 105 (Previously Presented):** The system of claim 103 wherein the  
2       predetermined surface layer is patterned to guide or shape the light output by the plurality  
3       of light sources.

1       **Claim 106 (Previously Presented):** The system of claim 103 wherein the  
2       predetermined surface layer includes a grating structure.

1       **Claim 107 (Previously Presented):** The system of claim 106 wherein the refractive  
2       index of the grating structure is capable of being changed dynamically.

3       **Claim 108 (Previously Presented):** The system of claim 106 wherein the EIW unit  
4       further includes an acoustic modulation module disposed in or on the substrate to control  
5       the refractive index of the grating structure.

1       **Claim 109 (Previously Presented):** The system of claim 102 wherein the sensor  
2       and source operate in an end-point mode.

1       **Claim 110 (Previously Presented):** The system of claim 102 wherein the sensor  
2       and source operate in a real-time mode.

1       **Claim 111 (Previously Presented):** The system of claim 102 wherein predetermined  
2       surface layer includes a plurality of layers.

1 Claim 112 (**Currently Amended**): The system of claim 111 ~~402~~ wherein the  
2 plurality of layers ~~is comprised of~~ includes a composite dielectric structure.

1 Claim 113 (**Previously Presented**): The system of claim 102 wherein the intensity  
2 of the light output by the plurality of light sources may be varied or modulated.

1 Claim 114 (**Previously Presented**): The system of claim 102 wherein the intensity  
2 of the light output of a first light source of the plurality of light sources may be varied or  
3 modulated relative to another light source of the plurality of light sources.

1 Claim 115 (**Previously Presented**): The system of claim 94 wherein the computing  
2 device determines the thickness of a surface layer formed by the integrated circuit  
3 processing equipment during processing.

1 Claim 116 (**Previously Presented**): The system of claim 94 wherein the computing  
2 device determines the spatial distribution of a surface layer formed by the integrated circuit  
3 processing equipment during processing.